HERPETOLOGIA

STATUS OF THE PROG GENUS SPHOENOHYLA WITH A SYNOPSIS OF THE SPECIES

BY

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There is, in South America, a small group of hylid frogs usually referred to as the *aurantiaca* group. The frogs of this group are known by their bright green or greenish yellow color in life, and their pointed and projecting snouts. In preservative they tend to assume a bent and cramped position and to fade rapidly, first to an orangish hue and then to a creamy white.

The Silver Springs Colombian Expedition of 1956 to Leticia in southern Colombia brought back no less than three species, two of them new, of this group. In studying these I have had occasion to examine representatives of all known forms, as well as to reconsider their generic status. Examination of their morphological characters, together with a consideration of what we know of their ecology, convinces me that these frogs, having as they do so many characters in common, one with another, form a natural group that differs from *Hyla* to such an extent that it should have generic status.

Daudin (1802) described two species, *aurantiaca* from "Brazil" and *lactea* from "America", naming them obviously from their orange and milky colors. Since the time of Gunther (1858), *lactea* has been considered synonymous with *aurantiaca*, a disposition with which I concur. Tschudi (1838:71) realized that these frogs differ in certain respects from typical *Hyla* and proposed for them the generic name *Spheenorhynchus*, designating *Hyla lactea* as the type.

This name was more or less ignored down through the years until Lutz and Lutz (1938) pointed out that Tschudi's name was preoccupied in ornithology and erected the subgenus *Sphoenohyla*, based on *aurantiaca* as the type, and described two additional forms, *Hyla* (*Sphoenohyla*) *orophila* and *H.* (S.) *planicola.*

Dr. Doris M. Cochran added one more form when she named *Hyla aurantiaca surda* in 1953.

Examination of specimens of *Hyla nana* Boulenger convinces me that it likewise belongs here.

SPHOENOHYLA Lutz and Lutz, 1938

Genotype. Hyla aurantiaca Daudin.

The following combination of characters should serve to distinguish frogs of this genus.

Generic Diagnosis. Moderate to small tree frogs of the family Hylidae, bright green or yellowish green in life; snout very pointed and projecting in lateral view; well developed horizontal dermal flaps usually present on each side of the anus; fingers weakly webbed, toes extensively webbed; a posteriorly projecting process on the ischium; male with a vocal pouch on the posterior throat region made up of longitudinal folds, bounded anteriorly and posteriorly by transverse folds.

Anatomical considerations. The most conspicuous feature of the external anatomy of these frogs is the external vocal pouch of the male. Rather than being up under the chin as it is in *Hyla* it is further back toward the pectoral region. On the throat, usually well behind the angles of the jaws, there is a transverse fold of skin that marks the anterior margin of the vocal pouch. The pouch itself is made up of a number of longitudinal folds, usually two or three on each side, that continue posteriorly from the anterior margin to end at another transverse fold across the chest (Fig. 1).

The internal vocal pouch is constructed on the same basic plan as in *Hyla* but has the posterior portion more extensively developed. It attaches posteriorly to the M. pectoralis rather than to the M. from a fold in the M. submaxillaris. In *Hyla* this muscle extends but sternoradialis. As in *Hyla*, the internal pouch is median and is formed slightly beyond the limits of the posterior tip of the mandibular ramus. It then puckers medially somewhat before folding under itself for about one fourth its length, where it again folds posteriorly to attach to the M. sternoradialis by means of connective tissue. In *Sphoenohyla* on the other hand, after the submaxillaris reaches

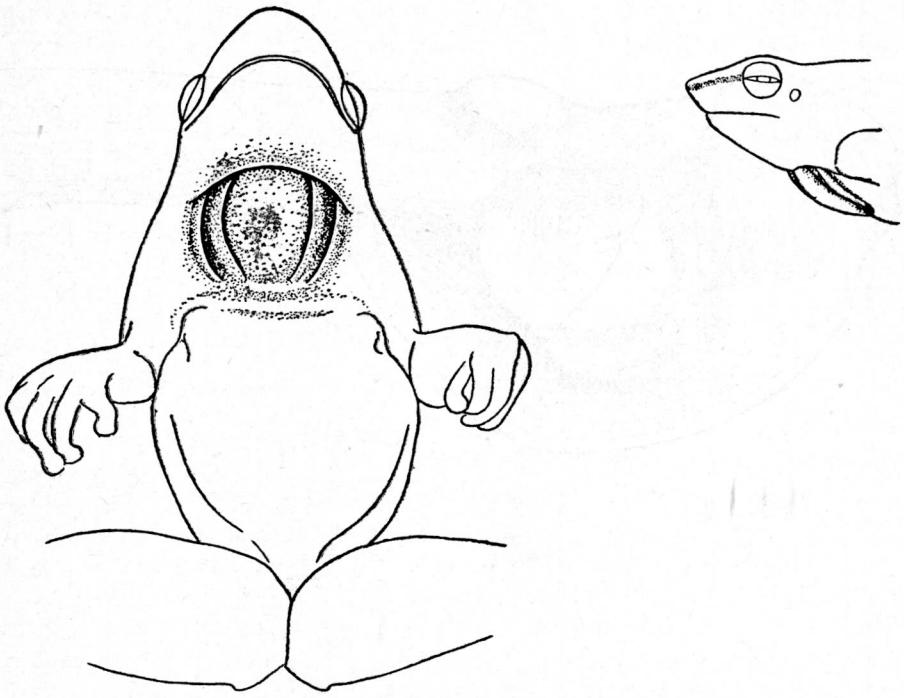

Figure 1.—Ventral and lateral view of *Sphoenohyla aurantiaca* from Leticia, Amazonas Commissaria, Colombia, showing the formation of the external vocal pouch and the pointed, projecting snout.

the level of the posterior tips of the rami of the mandibles it continues posteriorly about as far again in the manner of a bib to the region of the M. pectoralis, before it folds under itself and passes cephalad to about the posterior angles of the jaw. It then folds backward once more to continue posteriorly again until it attaches to the portio sternalis anterior of the M. pectoralis.

Since my colleague, Dr. Walter Auffenberg, has recently had occasion to study the ilia of a number of species of *Hyla* (Auffenberg, 1955) I asked him if he would examine the ilium of *Sphoenohyla aurantiaca*. This he consented to do and he also kindly prepared the drawings (Fig. 2) used here. He discovered no major differences in the ilia but found that the ischium has a backward projecting process that is absent in the species of *Hyla* examined (*cinerea, squirella, femoralis, crucifer, versicolor,* and *septentrionalis*). Cursory dissection of the musculature in this region revealed no noteworthy differences but Dr. Auffenberg informs me that the structure of the

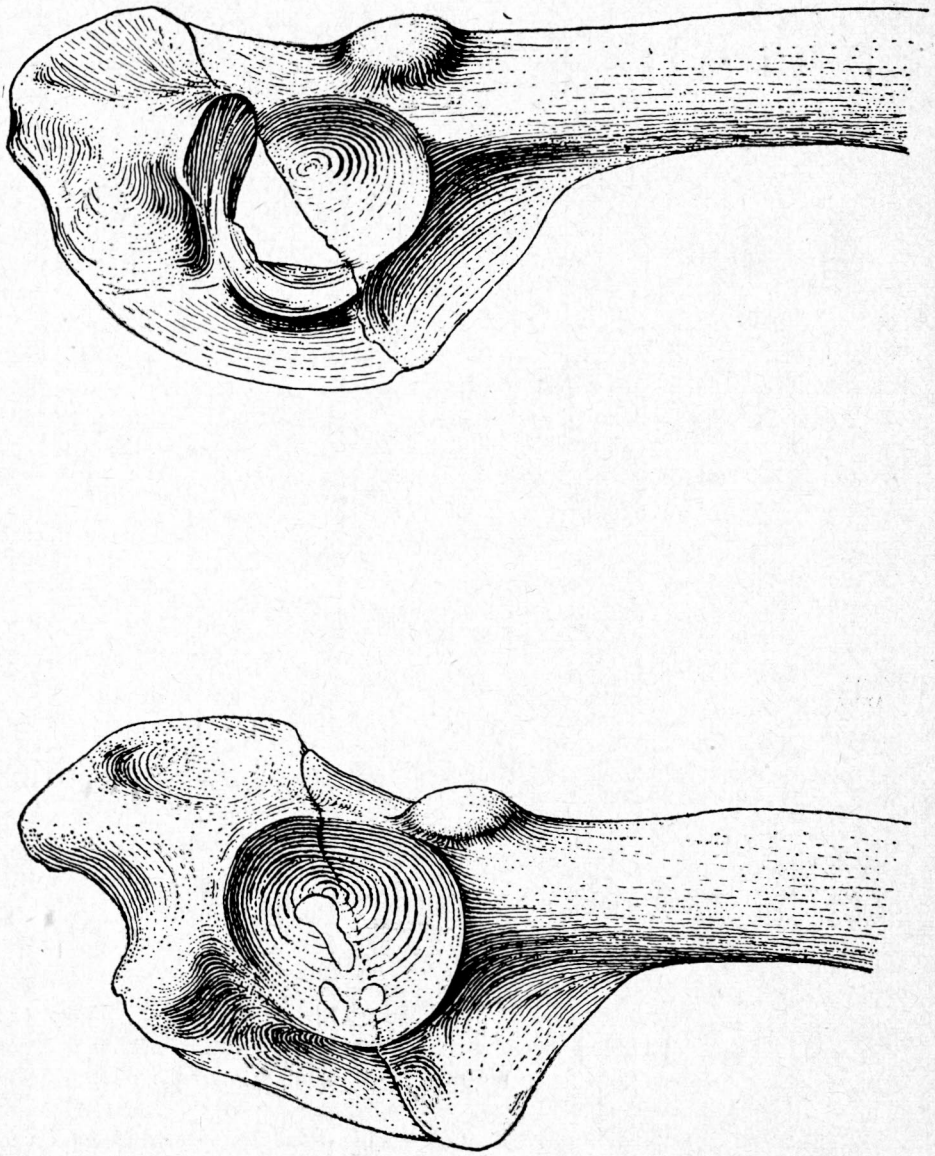

Figure 2.—Lateral views of the pelvic girdles of *Hyla cinerea cinerea* (above) and *Sphoenohyla aurantiaca* (below).

ischium suggests to him that these frogs are not jumpers to the extent that *Hyla* and *Rana* are. The pubic margin is also straighter than is typical for *Hyla*.

In the generic diagnosis Lutz and Lutz (1938:178) say "dentes maxillares minus numerosos, nec semper contiguos". In their discussion they state that *aurantiaca* has a reduced number of maxillary teeth, a character that will serve to distinguish it from all other South American *Hyla*. They give no counts to substantiate this statement. I have examined the maxillary teeth of two *aurantiaca* and specimens of three species of Florida *Hyla* and get the following counts: *S. aurantiaca* - 25,25; *Hyla c. cinerea* - 41, 43, 50, 51, 53, 55, 59, 66; *Hyla crucifer* - 26, 27, 31; *Hyla squirella* - 29, 49, 55.

The Lutzes did not say what South American species of *Hyla* they examined and it may well be, as they state, that the number of maxillary teeth will serve to separate *aurantiaca* (and possibly all *Sphoenohyla*) from South American *Hyla*. The above counts indicate to me, though, that it would be unwise to use the maxillary tooth count as a definitive generic character for the genus *Sphoenohyla* until far more individuals of far more species in both genera are examined and a careful statistical analysis made of the variation in dentition.

The whitish dermal flaps on either side of the anus are prominant features in all of these frogs except the two diminutive forms, *nana*, from Argentina, Bolivia, Paraguay, and Southern Brazil, and the new one described below from Leticia. The lack of these flaps in these two species may be indicative of a fundamental difference between them and the other species or it may simply be due to allometric growth. These two diminutive forms are likewise similar in that they have more dark pigment than the larger species and in that their vocal pouches are relatively larger than in the larger species. None the less, their pointed snouts, the cramped positions they assume in preservatives, their faded color, and the striking formation of their vocal pouches convinces me that assignment of them to the genus *Sphoenohyla* gives the best indication of their true relationships.

Synopsis of the Species

There are at present five named forms that may be assigned to this genus: *aurantiaca, orophila, planicola, surda,* and *nana*. Two of the species brought back by the Silver Springs Expedition differ from all of these and are apparently undescribed. One of them is a relatively large form nearly the size of *aurantiaca*. It gives me plea-

sure to dedicate it to Dr. Doris M. Cochran who introduced me to this group of attractive little frogs.

Sphoenohyla dorisae, sp. nov.

Type. Univ. Florida, 8506, adult male, collected near Leticia, Amazonas Comisaría, Colombia, S. A., Feb. 24, 1956, by James N. Layne and E. Ross Allen.

Paratypes. Univ. Florida, 8507 (5), 3 males and 2 females, with the same data as the type.

Diagnosis. A large *Sphoenohyla* (males 26.9 - 28.7 — females 35-35.7 mm.) with well developed anal flaps; with the tympanum moderately indistinct externally; and with the vomerine teeth in two tiny patches between and behind the choanae, the distance from the teeth to the choanae being about four or five times the diameter of an individual patch. There is no evidence of a stripe from the tip of the snout to the eye, nor of dorsolateral stripes.

It differs from *aurantiaca, orophila, planicola, surda,* and *nana* by the much greater distance, relatively, between the vomerine teeth and the choanae, as well as in details of color pattern. From the species described below it differs in the presence of vomerine teeth.

In life *dorisae* was a bright green with scattered small dark spots on the dorsum and the upper surface of the shanks. The external vocal pouch was yellowish green. In some individuals, there were, in addition to the dark spots, scattered, small, fleck-like light spots.

Description of type. Head moderately broad, width about equal to distance from snout to occiput; snout triangular as seen from above, apering to a slightly rounded tip; snout pointed and pronouncedly projecting as seen from side; the eyes very dark and thus standing out prominently against, and through, the milky white skin but eyes neither particularly large nor protuberant; diameter of eye about equal to distance from eye to nostril; nostril very near tip of snout; interorbital space about one and one half times the diameter of an individual eye; tympanum small and indistinct; distance from tympanum to eye about two thirds the diameter of tympanum; upper eyelids, top of head and dorsum finely rugose. Well developed discs on all fingers and toes; disc of second finger about equal to diameter of tympanum. Fingers not particularly slender; third finger webbed to the base of the penultimate phalanx; fingers 3-4-2-1 in order of decreasing length. A pronounced rudiment of a pollex. Toes moderately slender, fully webbed to

the base of the disc on each toe; toes 4-3-5-2-1 in order of decreasing length. Heels slightly overlapping when legs are flexed with femora held at right angles to the body; knees and elbows strongly overlapping when limbs are pressed along the side; heel extending to anterior margin of eye when leg is pressed along body. No patagium present. Chin, vocal pouch, venter and underside of thighs rugose. External vocal pouch a longitudinally folded structure that extends from a horizontal fold at the level of the angles of the jaws posteriorly to another horizonal fold at the level of the axillary region. A well developed, horizontal dermal flap on each side of the anus, each flap about two and one-half mm. in length, one mm. in height; a well developed horizontal dermal fold on each heel. Tongue broadly cordate, slightly free and slightly notched behind, its width about 4/5 the width of the mouth. Vomerine teeth in two minute, rounded patches behind a line between the internal nares and separated from them by about four diameters of an individual tooth patch; each patch of teeth smaller than an internal naris; the tooth patches separated on the midline by less than their own diameter.

Coloration of type (preserved). To the naked eye the type gives the impression of being uniform creamy white. Under low power magnification the back and the dorsal surfaces of the limbs can be seen to be finely sprinkled with red pigment. A trace of green can still be made out on the frontoparietal bones through the skin in the region of the eyes.

Measurements of type (in millimeters). Snout-to-vent length, 27.5; head width, 9.1; tip of snout to posterior margin of tympanum, 7.2; diameter of eye, 2.9; diameter of tympanum, 1.0±; hind leg (vent to tip of longest toe), 40.0; hind leg (vent to heel), 27.0.

Variation. The two females seem to have more spotting on the back than do the three males. In both of the females tiny, isolated rusty red spote are scattered over the dorsum and the dorsal surface of the shanks (after nine months in preservative). No such spots are discernable in the males although in one of them reddish pigment cells can be seen in the skin of the dorsum under low magnification (X6.6). Other than the pattern mentioned above, the skins of the specimens are uniform creamy white. As in other preserved *Sphoenohyla*, the eye, with its black choroid coat, stands out against the white skin.

In none of these specimens can any green in the bones be made out such as is present in some of the other species in this genus.

All of the specimens are uniform in having the fingers only about 1/3 webbed and in having the toes fully webbed to the base of the discs except the fourth toe which has a margin of web extending to the base of the disc.

In all of them the first finger is smaller in diameter than the others and seems to be twisted around so that it approaches the condition of being opposable. The same condition obtains in the other species of *Sphoenohyla* and field observations on how they use the hands are much to be desired. All of the paratypes have a rudimentary pollex.

They are consistent also in having the vomerine teeth in two tiny oval patches that are separated from the choanae by about four or five diameters of an individual patch.

There is a marked sexual dimorphism in size, the three males being 26.9, 27.8, and 28.7 mm. in snout-to-vent length while the two females are 36.4 and 37.2 mm. in snout-to-vent length.

Although there was no call identified with this species there can be no doubt about their maturity as the two females are packed with pigmented eggs.

The other new species brouught back by Dr. Layne and Mr. Allen from Leticia is a tiny form. Since some of its characters, such as the green bones, indistinct tympanum and lack of vomerine teeth, are known to be juvenile characteristics in some anurans I was at first loath to consider them as anything except possibly the young of *aurantiaca* or *dorisae* despite their difference in pattern, their well developed vocal pouches and their voice. Two of my colleagues, Drs. Robert M. DeWitt and John W. Brookbank made microscopic sections of the testicular tissue from one of males, however, and the examination of the slides revealed that the seminiforous tubules are simply swarming with mature spermatozoa. Hence these frogs mut be considered mature specimens. This leaves no alternative but to consider them representatives of an undescribed diminutive species.

Sphoenohyla habra, sp. nov.

Type. Univ. Florida, 8508, adult ,male, collected near Leticia James N. Layne and E. Ross Allen.

Paratypes. Univ. Florida, 8509 (4), three males and a female with the same data as the type, and USNM 138859, adult female collected at Leticia in 1956 by E. Ross Allen.

Diagnosis. A small *Sphoenohyla* (males 15.1 - 16.4, female 19.1 mm.) with poorly developed anal flaps; with no apparent external tympanum; and without vomerine teeth. There is a dark rusty brown stripe from the tip of the snout to the eye and similarly colored dorsolateral stripe extending from the eye to the region of the sacral hump.

It differs from all other known species in the genus except *nana* by its small size and from all of them in its lack of vomerine teeth as well as in details of color pattern.

In life it was bright green above, paler below with the external vocal sac bright green. The upper eyelids were reddish; there was a rusty red stripe from the tipe of the snout to the eye and a dorsolateral rusty red stripe on each side that extended from the eye to the region of the sacral hump; on the top of the head and dorsum were numerous, small, scattered rusty red spots.

Description of type. Head moderately broad, width about equal to distance from snout to occiput; snout an obtuse triangle as seen from above, tapering abruptly to a slightly rounded tip; snout pointed and pronouncedly projecting as seen from the side; the eyes very dark and thus standing out prominently against, and through, the milky white skin but the eyes neither particularly large nor protuberant; diameter of eye equal to distance from eye to tip of snout; nostrils very near tip of snout; interorbital space about one and one-fourth times the diameter of an individual eye; no external tympanum discernable; upper eyelids, top of head and dorsum smooth. The urostyle, vertebrae and the frontoparietal bones are bright green in color and show clearly through the pale whitish skin of the back; the green limb bones of the hind legs can be plainly seen from the ventral surface. No green is discernable through the skin on the front limbs or pectoral girdle. Well developed discs on all fingers and toes. Fingers, except first, not particularly slender; with but the merest rudiment of a web; first finger pronouncedly shorter and slenderer than the second; fingers 3-4-2-1 in order of decreasing length. A pronounced rudiment of a pollex. Toes moderately slender, all fully webbed except the fourth which is webbed to the penultimate phalanx and has a margin of web to the disc; toes 4-3-5-2-1 in order of decreasing length, toes 3 and 5 being nearly subequal. Heels slightly overlapping when legs are flexed with femora held at right angles to the body; knees and elbows slightly overlapping when limbs are pressed along body. No patagium present. Chin, vocal pouch, venter and underside of thighs rugose. External vocal pouch a longitudinally folded structure that

extends from a horizontal fold at the level of the angles of the jaws posteriorly to another horizontal fold at the level of the axillary region. No welldeveloped dermal anal flaps. Tongue broadly cordate, slightly free and slightly notched behind, its width about 4/5 the width of the mouth. No vomerine teeth. Internal nares moderate in size and well separated.

Coloration of type (preserved). Ground color creamy white. Small clusters of pigment cells make a number of reddish spots on top of the head, the dorsum and on the dorsal surfaces of the shanks. A reddish brown stripe from the tip of the snout through the nostril to the eye. In this specimen there is now, after nine months in preservative, but the faintest suggestion of a continuation of this stripe through the eye and posteriorly in the form of a dorsolateral stripe. As mentioned above, the green bones of the axial skeleton show through the skin of the back.

Measurements of type. (in millimeters). Snout-to-vent length, 15.8; head width, 5.5; tip of snout to posterior margin of eye, 4.2; diameter of eye, 2.3; hind leg (vent to tipe of longest toe), 24.1; hind leg (vent to heel), 13.2.

Variation.—In all four of the paratypes the bright green frontoparietal bones of the skull and the green vertebrae show clearly through the milky white skin. All of the specimens have the dark, rusty red spots on the back although there is variation in conspicuousness. In one male particularly they are either not fully developed or have faded since preservation so that only a few are noticeable on the anterior portion of the dorsum. One of the specimens has them moderately developed while one male and the female have conspicuous, although small, rusty red spots over the entire top of the head and dorsum and on the dorsal surface of the shank. In the female the rusty colored dorsolateral stripe can still be made out extending from behind the eye to about the region of the sacral hump. The dark loreal stripe from the tip of the snout to the eye is present in all specimens.

Structurally the specimens are rather uniform. None of them has apparent external tympani or discernable vomerine teeth. In all of them the toes are extensively webbed while the fingers are but very slightly webbed. The first finger on these specimens, like th etype, is much cmaller in diameter than the others. These specimens, as well as the type, have a rudimentary pollex. The three males have external vocal pouches similar to that of the type.

As in the other two species of *Sphoenohyla* from the same locality, (*aurantiaca* and *dorisae*) there seems to be a sexual difference

in size, the female has a snout-to-vent length of 19.1 mm. while the three males are 15.1, 15.7 and 16.4 mm. in snoutu-to-vent length.

Coloration in life. In file these frogs were bright green above with a pair of rusty red dorsolateral stripes and small rusty red spots on the legs. The upper eyelids were reddish. The vocal pouch of the male was bright green .The underside of the hind legs was greenish with the rest of the venter pale greenish white.

Sphoenohyla aurantiaca (Daudin)

Hyla aurantiaca, Daudin. 1802. Hist. Nat. des Rainettes, p. 28.

Hyla lactea, Daudin, 1802, Hist. Nat. des Rainettes, p. 30.

Type locality. "This species lives in Brazil". (Daudin, 1802:28). Lutz and Lutz (1938:177) say, "it is almost certain to belong to the northern form, since most of his (Daudin's) specimens of South American batrachians come from Cayenne and the northern part of the continent".

Diagnosis.—(Based on fifteen specimens from the upper Amazon River at Leticia, Colombia). A large *Sphoenohyla* (males 35.4 - 37.4; females 42.6 mm.) with well developed anal flaps; with the tympanum readily apparent externally; and with the vomerine teeth in two oval patches between and slightly behind the choanae, the distance from the teeth to the choanae about equal to the greatest diameter of a tooth patch. A dark, rusty red stripe extends from the tip of the snout to the eye, and a narrow, white dorsolateral light stripe extends from the eye to the level of the vent.

It differs from the species *dorisae* in the presence of dorsolateral *light* stripes. It also differs from *dorisae* in the relatively reduced distance between the teeth and the choanae and in the presence of the dark stripe from snout to eye. From *orophila* and *surda* it differs in lacking a dark brown margin below the light dorsolateral stripe and in its larger size. Size will serve to distinguish it from *planicola, nana,* and *habra.*

In life, specimens of *aurantiaca* are greenish yellow above with faint, light yellowish, dorsolateral light stripes from the eye to the groin, a distinct white line on the back of the forearm from the elbow to the wrist, and a similar line on the foot from the ankle to the base of the toes. The external vocal pouch is bright greenish yellow.

Distribution. - *S. aurantiaca* is the only form so far known that has been reported from localities indicating an extensive range; it has been reported from the Guianas, Colombia, Bolivia and Brazil

(see Lutz and Lutz, 1938:175, and Boulenger, 1882:388). Even with the recognition of *dorisae* and *habra* it may well be that *aurantiaca* auct. fron northern South America is still a composite with several species involved.

Sphoenohyla orophila (Lutz and Lutz)

Hyla (*Sphoenohyla*) *orophila*, Lutz and Lutz, 1938, Ann. Acad. Brasileira de Sci., Tome X, p. 178.

Type locality. - Serra do Mar, 4 km. outside Petropolis, in canal leading to the dam at Quitandinha.

Diagnosis. (Based on three specimens, U.S.N.M. 96692-4, from Bonito in the Serra do Bocaina, at the limits of the states of Saô Paulo and Rio de Janeiro). A large *Sphoenohyla* (males 29.3 - 31.8; female 35.0 mm.) with well developed anal flaps; with the external tympanum readily discernable; and with the vomerine teeth in two small, oval patches between and slightly behind the choanae, the distance from the tooth patch to the choana being about equal to the greatest diameter of a tooth patch. There is evidence of an indistinct dark stripe from the tip of the snout to the eye and a pale dorsolateral stripe that runs from the eye to the groin is discernable. This latter stripe is margined below by an indistinct brown marginal line.

From *dorisae* it differs in the presence of light dorsolateral stripes and in the relatively reduced distance between the vomerine teeth and the choanae. Its greater size and the presence of light dorsolateral stripes differentiate it from *planicola*. Its greater size and the presence of well developed anal flaps will distinguish it from *habra* and *nana*. From *aurantiaca* it differs in having an indistinct dark brown border on the ventral side of the dorsolateral light stripe. It is most like *surda* but *surda* has more distinct and sharply defined dark stripes on the snout and in the dorsolateral region and fewer pigment spots between the dorsolateral stripes.

Concerning their coloration in life, Lutz and Lutz (1938:180-181) say they are, "Deep gren, the hues differing according to the region of the body and the colour phase of the individual (these frogs get darker when handled and loose their green colour when not in good health). Dorsal surfaces deep shades of green (grass, or even parrot, green). Throat intense (apple) green, the folds of the vocal sac citron. Abdomen opaque, cream, greenish where the skin makes folds. Lower surfaces of limbs more bluish (malachite green). Fingers and toes yellowish. On the articulations the colour deepens to

blue (almost myrtle) green. Skin translucent, especially at the sides of the body and on the lower surfaces of limbs, so that the organs, veins, nerves and green long bones are visible, including the claw-like terminal phalanx. Very striking, blue-white, glands on each side of anus on raised pads; white or golden dots on the outside of fore-arm and, to a lesser extent, of foot, giving the appearance of a wavy outline. A golden stripe, underlined in brown, begins at the tip of the snout and ends at the groin, passing over the canthus rostralis and the eyeball, continuing dorsolaterally and neatly separating the back from the sides. Viewed under the lens it appears composed of golden and brown dots. A bronze-coloured spot over the top of the eyeball. This pattern is absolutely constant. Iris entire, or with very small, knob-like, median lobes. Ground-color green over gold, with brown pigment unevenly distributed, especially on the sides and a few indistinct brown veins. Tympanum covered by skin, only visible from a certain angle or during movements caused by deglutition. Nictitating membrane with light brown border at free rim".

Distribution. At present known from the hilly country in the state of Rio de Janeiro and adjacent portions of Saô Paulo.

Sphoenohyla planicola (Lutz and Lutz)

Hyla (*Sphoenohyla*) *planicola*, Lutz and Lutz, 1938, Ann. Acad. Brasileira de Sci., Tome X, p. 182.

Type locality. Recreio dos Bandierantes, Federal District, State of Rio de Janeiro, Brazil.

Diagnosis. (Based on three topotypes, U.S.N.M. 97619-21). A small *Sphoenohyla* (males, 22.5 - 23.5; female 27.3 mm.) with well developed anal flaps; with the tympanum moderately prominent externally; and with the vomerine teeth in two small oval patches between and slightly behind the choanae, the distance from the teeth to the choanae being about equal to the greatest diameter of a tooth patch. In preservative, the specimens are a uniform pale creamy white.

From *aurantiaca* and *orophila* it differs in its small size and lack of pattern; from *dorisae* it differs in its smaller size and in the relatively small distance between the vomerine teeth and the choanae; from the other species, *habra, nana* and *surda*, it differs in the lack of dark stripes on the snout and the dorsolateral region and from *habra* also in the presence of vomerine teeth.

In life it has been described as intense green on the exposed surfaces of the body with the concealed surfaces paler, sometimes with white lines on the forearm and foot. The anal flaps are white.

Distribution. All localities are from the Baixada Fluminense, which is a swampy region along the coast near Rio de Janeiro.

Sphoenohyla surda (Cochran)

Hyla aurantiaca surda, Cochran. 1953. Herpetologica, Vol. 8. p. 112.

Type locality. Brazil, Paraná, near Curitiba.

Diagnosis. (Based on two paratypes, UMMZ 104116 (2) from Curitiba, Paraná, Brazil). A moderate sized *Sphoenohyla* (males 24.5 - 28.0 mm.; no females examined) with well developed anal flaps; with external tympanum but dimly perceptable; with the vomerine teeth in two small oval patches between and slightly behind the choanae, the distance from the teeth to the choanae being about equal to the greatest diameter of a tooth patch. A dark, rusty red stripe extends from the tip of the snout through the eye and posteriorly as a dorsolateral stripe to the region of the sacral hump.

It differs from the species *aurantiaca*, *planicola*, and *dorisae* by the presence of dark dorsolateral stripes. From *orophila* it differs in having more pronounced dark stripes on the snout and in the dorsolateral region and in having practically no pigment between the dorsolateral stripes. From *dorisae* it differs also in having relatively less distance between the choanae and the vomerine teeth. Adult size and the presence of well developed anal flaps will serve to distinguish it from *habra* and *nana*.

In life it is "a beautiful emerald green species." (Cochran, 1953:114).

Distribution. At present it is known only from the type locality.

Note. Although Miss Cochran described this as a subspecies of *aurantiaca* I use the binomial here because it does not seem to me that there is at present sufficient data to determine accurately the relationships of the various forms in this genus and the presence of no less than three forms at Leticia demostrates that they are not all simply vicariant populations of a single, wide spread, polytypic species.

Sphoenohyla nana (Boulenger)

Hyla nana, Boulenger, 1889. Ann. Mus. Storia Nat. Genova, p. 249.

Type locality. Colonia Resistencia, S. Chaco, Argentina.

Diagnosis. (Based on nineteen specimens as follows: Lassance, Minas Gerais, Brazil, USNM 98130, 98133; Itapetininga, USNM 102283, Perus, USNM 102706, Ypiranga, USNM 102707-08, and USNM 102301 without specific locality, all from the State of Saô Paulo, Brazil; S. Leopoldo, Santa Catarina, Brazil, USNM 103619-20; Corumba, USNM 132965-66, Porto Esperanza, USNM 132962-64, one day's run below Descalvades, USNM 132735, and USNM 101448 without specific locality, all from the State of Mato Grosso, Brazil; and USNM 101442-43 from Buena Vista, Santa Cruz, Bolivia). A small *Sphoenohyla* (males 17.4 - 21.9 mm.; females 15.7 - 26.6 mm.) without well developed anal flaps; with vomerine teeth; with a dark stripe from the tip of the snout to the eye; with a pale dorsolate-margined below, and sometimes above, by rusty red dark stripes. This gives the impression that these pale frogs simply have one, or sometimes two, dark dorsolateral stripes.

The small size and lack of well developed anal flaps will serve to distinguish it from all other species in the genus except *habra*. From *habra* it differs in the presence of vomerine teeth.

Dr. Cochran says of the specimens she collected at Lassance, Minas Gerais that "The adult males when alive are yellowish." (1955:126).

Distribution. This form has a rather wide range in Southern Brazil and adjacent countries. In addition to the type locality at Colonia Resistencia, S. Chaco, Argentina, it has been recorded from Alto, Asunción and San Bernardino in Paraguay, from Buena Vista, Santa Cruz, Bolivia, and from various localities in the states of Minas Gerais, Mato Grosso, Sao Paulo, Santa Catarina and Rio Grande do Sul in Brazil.

It may well be that the population in the western portion of the range may someday be shown to deserve nomenclatorial recognition. The two from Bolivia are the largest of their respective sexes that I have seen, the male measuring 21.9 mm. in snout-to-vent length and the female 26.6 mm. As Dr. Cochran has pointed out (1955:126), "The female has a trace of four dorsal dark lines, represented only by widely spaced sepia spots. The male has the central pair of dorsal lines quite plainly marked, but the outer pair

is nearly invisible. In neither of these two specimens do the lines diverge, nor are there separate sacral lines or spots".

Key to the Species

1	Small species, snout-to-vent length of male less than 20.00 mm. (except specimens from western Santa Cruz, Bolivia); no distinct dermal flaps on each side of anus	6
1'	Larger species, snout-to-vent length of males exceeding 20.00 mm.; distinct dermal flaps on each side of anus	2
2	No dark stripe from tip of snout to eye	3
2'	A dark stripe present from tip of snout to oye	4
3	Distance from vomerine teeth to choanae about equal to the greatest diameter of a vomerine tooth patch, snout-to-vent length less than 25.0 mm...	*S. planicola*
3'	Distance from vomerine teeth to choanae 4 or 5 times the greatest diameter of a vomerine tooth patch, snout-to-vent length greater than 25,5 mm.	*S. dorisae*
4	Dark dorsolateral stripes present, or if white or yellowish dorsolateral stripes present these bordered along their ventral margin by at least a marginal line of dark brown	5
4'	No evidence of dark coloring in the region of the whitish dorsolateral stripes	*S. aurantiaca*
5	Whitish or yellowish dorsolateral light stripes along side that are bordered below by an indistinct brown margin	*S. orophila*
5'	Dorsolateral markings consisting of sharply defined dark brown stripes below pale dorsolateral stripes that extend to the region of the sacral hump	*S. surda*
6	Vomerine teeth present	*S. nana*
6'	Vomerine teeth absent	*S. habra*

Natural History

The following natural history notes, taken from the literature and from Dr. Layne's field notes, seem to corroborate the morphological indications that these species comprise a rather uniform group of closely related frogs.

S. aurantiaca. Concerning specimens taken at Benjamin Constant and along the Rio Itacoai in north-western Brazil, Lutz and Kloss (1952:658) say, "They were all sitting on marginal grass floating on the water". Dr. Layne's field notes of specimens taken at Leticia, Colombia (which is just across the river from Benjamin Constant, Brazil) states that they were, "Collected on grass stems and vegetation growing in water at edge of stream". He informs me that all the three species he collected there were very docile when captured.

S. surda. Dr. Cochran (1953:114) quoting from Dr. Bailey's field notes says the type and one paratype were found in "Prairie just south of town, singing from low bushes in boggy prairie stream bed" and that the other three were taken "west of town (Curitiba), singing around open ponds from grass and cattails; call like hitting resonant rocks together quickly 4 or 5 times. Low swampy area, most of it well wooded with thick brush or second growth".

S. planicola. The natural history of this species has been mentioned by several authors. Lutz and Lutz (1938:185) in the original description say, "Its habits are aquatic; it is found almost always inside open, sluggish or still, water. The first specimens were caught sitting on the pads of water lilies on *Pistia stratiotes* and one or two in the water itself. Later a few couples were caught mating on the broad leaves of plants at the edge of pools. The tadpoles were not seen.

"The voice is thinner than that of *H.* (*Sphoenohyla*) *orophila.* It has a preparatory note like the cycad, and is midway between a croak and a chirp. It is very characteristic when one knows it and repeats itself at intervals but is not continuous.

"In the vivarium male specimens sometimes sing at dusk, becoming greatly inflated at the sides and on the lower surface. They sit upright."

Myers (1946:30) says, "On floating aquatic vegetation".

Lutz (1954:232) gives the following statements.... "Spawns on leaves". "Lowlands, aquatic, calls afloat on lesser arms of lagoons. Voice *crack, crack*".

In her monograph Dr. Cochran (1955:188) gives the following remarks. "The frogs of this species were all caught at night in the stagnant water of a swamp. The male floats while calling for the females. At this time the frog can be lifted out of water on the open palm of the hand and transferred to the collecting bag without closing the fingers.

"The mating call begins with a *tang*, followed by a chirping like a cicada. In calling, the vocal sac gets so large that the rest of the small body almost disappears behind it".

S. orophila. The describers of this species presented the following notes on its natural history (Lutz and Lutz, 1938:181-2).

"*H.* (*Sph.*) *orophila* is a mountain species as its name denotes. We have found it in several localities of the Serra do Mar. At Petropolis it comes to the very edge of the mountains, but we have never seen it below. It lives in, or near, sluggish or still, open water, generally sitting on the submerged vegetation, or apparently floating on the enormously distended vocal sac. Both large and young specimens, with tail and four legs, are to be found with only the triangular head showing, from the nostrils to the eyes. One has to go into the water after them, with artificial illumination, at dusk or at night. A few males were caught by us spreadeagled on the reeds at the edge of a canal leading to a dam; they had the right limbs on one reed and the left ones on another one.

"Isolated individuals may be heard calling even in day-time and after dusk the chorus becomes more general.

"The voice is a double *'crack crack'*, or a twice double one, intermediate between a quack and a cluck. It is repeated at short intervals. When caught singing, male specimens will go on calling for hours, even during transportation, on long trips, by water, railway or road. The continue to call for many evenings in captivity.

"*H.* (*Sph.*) *orophila* is realtively (*sic*) hardy in the vivarium; we have kept specimens for more than a month at a time. Sometimes they are found clinging to the corners, or under the lid, but often they prefer to hide under vegetation and old pieces of wood in the water. They sit up in a peculiar way, with the head and shoulders lifted obliquely and a pronounced saddle-like depression above the sacrum. In this position they apper very broad in the beam, owing to the short triangular head and the very stout hind limbs".

S. dorisae. Near Leticia these frogs were fairly common on grass stems and bushes growing in water at the edge of a cove of a small

stream. The area surrounding the cove was overgrown with brush and herbaceous vegetation. No calll was identified with this species.

S. habra. These were collected near Leticia on grass and bushes in flooded areas bordering a stream. The usually called close to the water surface and a few were seen actually in the water. The call is a thin, high, *kik-kik-kik-kik.* It is given rapidly and has a insect-like quality.

S. *nona.* "Specimens of H. *nana* were collected at Lassance as they sang at night on the aquatic plants growing in the shallow waters on the lagôa in the center of a wide grassy plain near the foothills of Serra do Cabral". (Cochran, 1955:126).

From the above resume of what we know of the different species in this genus, it can be seen that they are rather consistant in calling from either the water or vegetation floating on or emergent from the water and that they select quiet waters, either in swamps and prairies or the quieter coves of streams. Everything seems to indicate that they are quite aquatic.

It should be pointed out though, that all of the observations obviously pertain to breeding congresses and that our knowledge of their non-breeding habitat remains a blank.

It is interesting that Dr. Auffenberg's guess that these frogs are not markedly saltatorial, based on a study of the pelvic girdle, is borne out by Dr. Layne's and Dr. Cochran's findings from field observation.

SUMARIO

Hay en Suramérica un pequeño grupo de ranas (familia Hylidae) caracterizadas por hocicos largos y puntiagudos, por hábitos muy acuáticos y en el caso de los machos por tener la bolsa vocal formada de pliegues longitudinales sujetos anterior y posteriormente por pliegues transversales (véase fig. 1). En vida son estas ranas de color verde brillante o amarillo verdoso; preservadas en un líquido cambian primero a un matiz anaranjado y después a blanco cremoso.

El subgénero *Sphoenohyla,* que fue descrito para estas ranas por Lutz y Lutz en el año 1938 con el tipo H. *aurantiaca,* se redescribe y lleva aquí a un género completo que incluye las ya nombradas especies: *Hyla aurantiaca* Daudin, *Hyla* (*S.*) *orophila* Lutz y Lutz, *Hyla* (*S.*) *planicola* Lutz y Lutz, *Hyla aurantiaca surda* Cochran, y *Hyla nana* Boulenger. Se describen dos nuevas especies, *Sphoenohyla dorisae* y *S. habra,* de Leticia (Comisaría del Amazonas, Colombia).

Todas las formas previamente nombradas son redefinidas y se incluye una clave de todas las especies conocidas.

Nuestro conocimiento de la historia natural de todas las especies queda así sumarizado. Parece que todas se crían en aguas quietas y poco profundas, y croan, ya desde la superficie del agua o desde la vegetación flotante o emergente sobre el agua.

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